

NOVEMBER/DECEMBER 2025

**23PMB32 — MOLECULAR BIOLOGY AND
RECOMBINANT DNA TECHNOLOGY**

Time : Three hours

Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

What is semi-conservative DNA replication?

2. List the functions of RNA Polymerase I, II and III in eukaryotes.
3. Define a silent mutation and give an example.
4. Differentiate between a frameshift mutation and a base substitution.
5. Describe the blue-white screening technique.
6. Differentiate between a plasmid and a cosmid.
7. Explain the purpose of restriction mapping.
8. What is primer walking?



9. Define callus culture and its application.
10. Why is cytotoxicity testing important in cell culture?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) (i) Describe the bi-directional mode of replication in DNA
- (ii) Explain the rolling circle mode of replication.

Or

- (b) Define post transcriptional modification and briefly explain the different types of post transcriptional modification.

12. (a) State the difference between prokaryotic and eukaryotic promoters.

Or

- (b) Narrate the process of regulation of gene expression in *lac operon*.

13. (a) Write short notes on DNA Methylase and ligase.

Or

- (b) Briefly explain the eukaryotic vectors.

14. (a) State the difference between genomic DNA and cDNA library.

Or

- (b) Describe about sanger's method of DNA sequencing.

15. (a) Give short notes on (i) suspension cell culture (ii) callus culture.

Or

- (b) State the types of vectors in Gene therapy.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Illustrate the mechanism of semiconservative replication.

17. Explain in detail mechanism of DNA repair.

18. Describe the types of plasmid vectors.

19. Describe the principles and applications of PCR.

20. Define gene therapy. Explain in detail about Ex Vivo and In vivo Gene therapy.